THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A system comprising a compressor having an inlet stream and an outlet stream, a pre-heater having a process inlet stream and a process outlet stream, a catalytic combustor having an inlet stream and an outlet stream and containing an catalyst, and a turbine having an inlet stream and an outlet stream, wherein, the outlet stream of the compressor is connected to the process inlet stream of the pre-heater, the process outlet stream of the pre-heater is connected to the inlet stream of the catalytic combustor, and the outlet stream of the catalytic combustor is connected to the inlet stream of the turbine, and wherein, during operation of the system, the inlet stream of the compressor has a substantially constant and low concentration of fuel.

2. A system as claimed in claim 1, wherein the fuel comprises a gas with a methane concentration of 0.5 to 1.5 mole%.

3. A system as claimed in claim 1, wherein the fuel comprises a gas with a methane concentration of approximately 1 mole%.

4. A system as claimed in any one of the preceding claims, wherein the inlet stream of the turbine has a temperature of less than 800°C.

5. A system as claimed in any one of the preceding claims, wherein the catalytic combustor contains a catalyst having a high activity ($50\text{-}200\times10^{-7}$ mole/(m^2s)) and a high reaction surface area ($20\text{-}40 m^2/cm^3$).

6. A system as claimed in any one of the preceding claims, wherein the catalytic combustor has a maximum continuous bed surface temperature of 950°C.

7. A system as claimed in any one of the preceding claims, wherein the catalytic combustor is a honeycomb-type monolith reactor.

8. A system as claimed in claim 7, wherein the monolith is a ceramic, which acts as a substrate for a

wash coat slurry of base metals on which a noble metal catalyst is placed.

9. A system as claimed in any one of the preceding claims, wherein the catalytic combustor has a combustion efficiency of greater than 99%.

10. A system as claimed in any one of the preceding claims, wherein the outlet stream of the compressor has a pressure of less than 3.5 bar (absolute).

11. A system as claimed in any one of the preceding claims further comprising a generator, which is connected to the turbine, wherein the generator converts the shaft work produced by the turbine into electrical energy.

12. A system as claimed in any one of the preceding claims, the system further comprising a recuperator to recover some of the energy in the outlet stream of the turbine.

13. A system as claimed in claim 12, wherein the recuperator and the pre-heater form a single integral unit, wherein, the pre-heater has a heating inlet stream and a heating outlet stream, the heating inlet stream being connected to the outlet stream of the turbine such that the outlet stream of the turbine is used to heat the outlet stream of the compressor.

14. A system as claimed in any one of the preceding claims, further comprising a heat recovery boiler, the boiler having an inlet stream connected to the heating outlet stream of the pre-heater, wherein the boiler is adapted, in use, to recover energy from the turbine outlet stream.

15. A system as claimed in any one of the preceding claims, the system further comprising a pre-burner having an inlet stream, an outlet stream and a start up fuel stream, the inlet stream being connected to the process outlet stream of the pre-heater, and the outlet stream being connected to the inlet stream of the catalytic combustor, wherein the pre-burner is used to combust the start up fuel stream during start up of the turbine and

during low load operation.

16. A system as claimed in claim 15, wherein during normal operation of the system, the start up fuel stream has a flow rate of 0 and the process outlet stream of the pre-heater passes through the pre-burner unreacted.

17. A system for providing fuel to drive a catalytic combustion gas turbine system, the system for providing fuel comprising a mixer, having an outlet stream and at least two inlet streams and a compressor, having an inlet stream, the outlet stream of the mixer being connected to the inlet stream of the compressor, wherein, during operation of the system, the at least two inlet streams are controlled so that the outlet stream of the mixer has a substantially constant composition over time.

18. A system as claimed in claim 17, wherein the outlet stream of the mixer has a concentration of methane of 0.5 to 1.5 mole%.

19. A system as claimed in either claim 17 or 18, wherein of the at least two inlet streams of the mixture, at least one inlet stream has a concentration of methane of 0 to 1.5 mole% and at least one other inlet stream has a concentration methane of over 20 mole%.

20. A system as claimed in any one of claims 17 to 19, wherein at least one of the at least two inlet streams in the mixer is a stream of ventilation air from a coal mine.

21. A system as claimed in claim 20, further comprising a first scrubber, the first scrubber being adapted, in use, to remove particles greater than and equal to 0.5 micron in diameter from the ventilation air.

22. A system as claimed in claim 21, wherein the first scrubber is also adapted, in use, to remove sulphur compounds from the ventilation air, so that the concentration of hydrogen sulphide and sulphur dioxide in a gas outlet stream of the first scrubber is no greater than 10ppm and 5ppm respectively.

23. A system as claimed in any one of claims 17 to

22, wherein at least one other stream of the at least two inlet streams of the mixer is a stream of coal mine drainage gas.

24. A system as claimed in claim 23, further comprising a second scrubber adapted, in use, to remove particles greater than and equal to 0.5 micron in diameter from the coal mine drainage gas.

25. A system as claimed in claim 24, wherein the second scrubber is also adapted, in use, to remove sulphur compounds from the coal mine drainage gas, so that the concentration of hydrogen sulphide and sulphur dioxide in a gas outlet stream of the second scrubber is no greater than 10ppm and 5ppm respectively.

26. A system as claimed in any one of claims 17 to 25, the system further comprising a reservoir, the reservoir having an outlet stream connected to the inlet stream of the compressor, and during operation of the system, the outlet stream of the reservoir has a substantially constant composition over time, wherein, the reservoir stores enough fluid to buffer fluctuations in the composition of at least one inlet stream of the reservoir.

27. A system as claimed in claim 26, wherein the outlet stream of the mixer is connected to the at least one inlet stream of the reservoir.

28. A method of producing electricity, the method comprising the steps of:

(a) mixing at least two gas streams to produce a process gas stream with a substantially constant and low fuel concentration prior to;

(b) compressing the process gas stream;

(c) preheating the process gas stream;

(d) combusting the process gas stream in the presence of a catalyst;

(e) expanding the process gas stream in a turbine to produce shaft work; and

(f) converting the turbine shaft work to

electricity using a generator.

29. A method of producing electricity as claimed in claim 28, wherein the process gas stream has a concentration of methane of 0.5 to 1.5 mole%.

30. A method of producing electricity as claimed in either claim 28 or 29, further comprising the step of scrubbing the at least two gas streams to remove particles greater than and equal to 0.5 micron in diameter and to remove sulphur compounds so that the process gas stream has a concentration of hydrogen sulphide and sulphur dioxide of no greater than 10ppm and 5ppm respectively.

31. A method of producing electricity as claimed in any one of claims 28 to 30, wherein the process gas stream is compressed to no more than 3.5 bar (absolute).

32. A method of producing electricity as claimed in any one of claims 28 to 31, wherein the process gas stream has a temperature of less than 800°C after combustion in step (d).

33. A catalytic combustion gas turbine system as substantially hereinbefore disclosed with reference to accompanying Fig. 1.